# ITU-R Standards Activities

## Outputs

- Technical support to the U.S. Administration in Working Party 8B, the Radar Correspondence Group, and Joint Rapporteurs Group 1A-1C-8B, and also in Study Group 3.
- Measurements performed to determine responsiveness of prototype dynamic frequency selection (DFS) devices to radar emissions at 5 GHz.
- Tests and measurements performed on effects of interference from communication system signals into a long-range air search radar.
- Joint ITS-OSM presentation on future X-band (9300-9500 MHz) radar development, given at a meeting of Study Group 8 in Geneva.
- Joint measurements between ITS, OSM, and the Administration of Japan on emission spectra of S-band and X-band maritime radars.

Success in worldwide telecommunication markets, as well as successful, compatible use of telecommunications technologies, is critical to the long-term success of the United States in many spheres. To achieve these goals, the U.S. Administration participates in a telecommunications standards and regulatory body, the International Telecommunication Union — Radiocommunication Sector (ITU-R), to further its objectives regarding all forms of wireless communication on a worldwide basis. ITS provides important, ongoing technical support for the U.S. Administration in ITU-R Study Groups 3 and 8 (see pp. 40-41); Working Party 8B; the Radar Correspondence Group (RCG), and Joint Rapporteur Group (JRG) 1A-1C-8B. Current areas of interest include (but are not limited to): dynamic frequency selection technology proposed for 5 GHz spectrum sharing between communication systems and radars; radar emission spectrum measurement techniques; effects on radars of interference from communication systems; and development of new X-band radar technologies.

A number of proposals have been made by non-U.S. Administrations to introduce communication systems into bands heretofore allocated for radars on a primary basis. Since the U.S. Administration has made an enormous investment in the development and deployment of military and civilian radars, it is essential that new systems proposed for spectrum sharing be shown to be electromagnetically compatible with existing and future radars. To this end, ITS engineers in FY 2004 tested the new technology, called dynamic frequency selection (DFS), for the U.S. Administration. The tests were conducted jointly by ITS, NTIA's Office of Spectrum Management (OSM), and industry. The DFS prototypes under test used RLAN technology to communicate in 5 GHz spectrum used by radars. The sharing technique requires that the DFS devices must sense radar signals and then vacate frequencies used by radars. The tests at ITS determined the extent to which prototype DFS devices accomplished this goal.

Other proposed techniques for sharing spectrum between radars and communication systems require that radar receivers sometimes operate co-channel with potentially interfering communication signals. Unfortunately, very little information has ever been gathered on the effects of interference from communication signals in radar receivers. ITS and OSM have worked together for several years to learn about these effects. As part of this effort, interference tests and measurements were performed by ITS and OSM engineers in FY 2004 on a long-range air surveillance radar at a joint FAA-NORAD site. In the course of the tests, interference signals were injected into the radar receiver while targets were observed. The effects on target detection were observed at a variety of interference levels. Targets were artificially generated for some tests, and were 'live' aircraft in other tests. The radar receiver was found to be highly sensitive and susceptible to such interference at rather low levels. The test results have been used for U.S. Contributions in WP-8B.

Additional work in ITU-R has been devoted to chairmanship of the Radar Correspondence Group by an ITS engineer, as well as ongoing support and written Contributions for JRG 1A-1C-8B on the topic of future development of radar technology in the X band (9300-9500 MHz).

ITS, OSM, and Japanese Administration engineers used a Draft New Recommendation (M.1177),


*Figure 1. Set-up for a joint US-Japan maritime radar emission spectrum measurement at the ITS Table Mountain facility near Boulder. The measurements were performed using new ITU Recommendation techniques primarily authored by an ITS engineer (photo by F.H. Sanders).*


*Figure 2. A meeting of Working Party 8B in Geneva in 2004. Critical US Administration spectrum interests are routinely supported by ITS engineers at this and other ITU meetings (photo by F.H. Sanders).*

primarily authored by an ITS engineer, to perform measurements on emissions on five maritime S-band and X-band radars. The measurements were performed at the Table Mountain facility north of Boulder (see Figure 1 above). Results will be used in future Contributions to WP-8B by both the US and Japanese Administrations (see Figure 2).

**Recent Publications**

F. Sanders, R. Hinkle, and B. Ramsey, "Measurement Procedures for the Radar Spectrum Engineering Criteria (RSEC)," NTIA Report 05-XX, in progress.

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